

UNITED STATES
ATOMIC ENERGY COMMISSION

In Reply Refer To:
RMB:ES

Oak Ridge, Tennessee
November 8, 1948

Carbide and Carbon Chemicals Corporation
P. O. Box P
Oak Ridge, Tennessee

Attention: Mr. C. M. Rucker, Jr., Executive Director,
Oak Ridge National Laboratory

Gentlemen:

Enclosed for your information is one copy of "Wind Roses for Stations on the Oak Ridge Area". These roses were compiled by Weather Bureau personnel from data supplied in part by Dr. K. Z. Morgan of the Health Physics Division.

Your cooperation in making the data available for this study is appreciated.

Sincerely yours,

Albert H. Holland Jr.
Albert H. Holland, Jr., M.D.
Director of Research and Medicine

Encl.:
"Wind Roses for Stations on
the Oak Ridge Area".

CC: Dr. K. Z. Morgan
J. Z. Holland
R. W. Cook
C. E. Center

Stoeckle/ds

This document has been approved for release
to the public by:

David R. Hamm 4/15/96
Technical Information Officer Date
ORNL Site

ChemRisk Document No. 2670

WIND ROSES FOR STATIONS ON THE
OAK RIDGE RESERVATION

1. Contents.

Attached are wind frequency and velocity roses for eight points of direction for the following locations and periods:

- a. X-10 Water Tower, elevation 140 ft. above surface, 1027 ft. MSL.
 - (1) Four seasons, July 1944 - June 1945 (#3-6).
 - (2) Annual, July 1944 - June 1945 (#2).
 - (3) "Extrapolated Normal Annual" (#1).
- b. Public Works Building, Oak Ridge, approximately 50 ft. above surface, approximately 950 ft. MSL.
 - (1) Four seasons: January and February 1948, March and June 1948, July and August 1948, and September 1948 and December 1947 (#9-12).
 - (2) Annual: December 1947, January - March 1948, June - September 1948 (#8).
 - (3) "Extrapolated Normal Annual" (#7).
- c. K-25, Building K-1004-D, approximately 30 ft. above surface, approximately 800 ft. MSL.
 - (1) May, June, August and September 1948 (#14).
 - (2) "Extrapolated Normal Annual" (#13).
- d. I-12 Water Filtration Plant, approximately 30 ft. above the surface, approximately 1150 ft. MSL.
 - (1) January 19 - February 13, 1947 (#16).
 - (2) "Extrapolated Normal Annual" (#15).
- e. Knoxville Airport, 71 ft. above the surface, 1020 ft. MSL.
 - (1) Average Annual: Frequency, 1939 - 1948, velocity, 1944-1947 (#17).

Encl

2. "Extrapolated Normal Annual" Wind Roses. Wind roses have been drawn up for Knoxville Airport data for periods identical with the periods of record of the various wind observations on the Oak Ridge area.

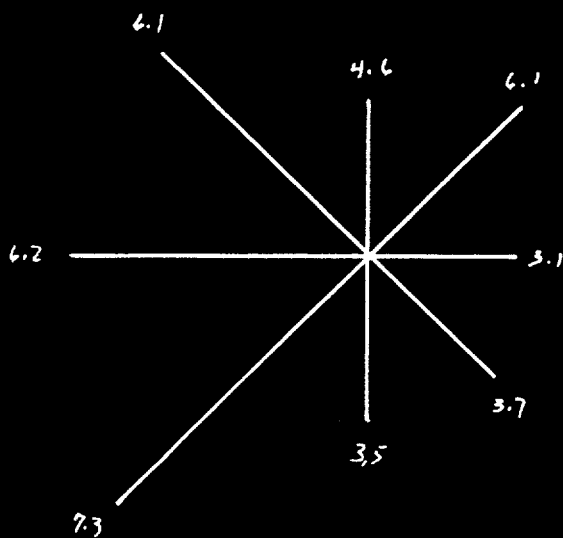
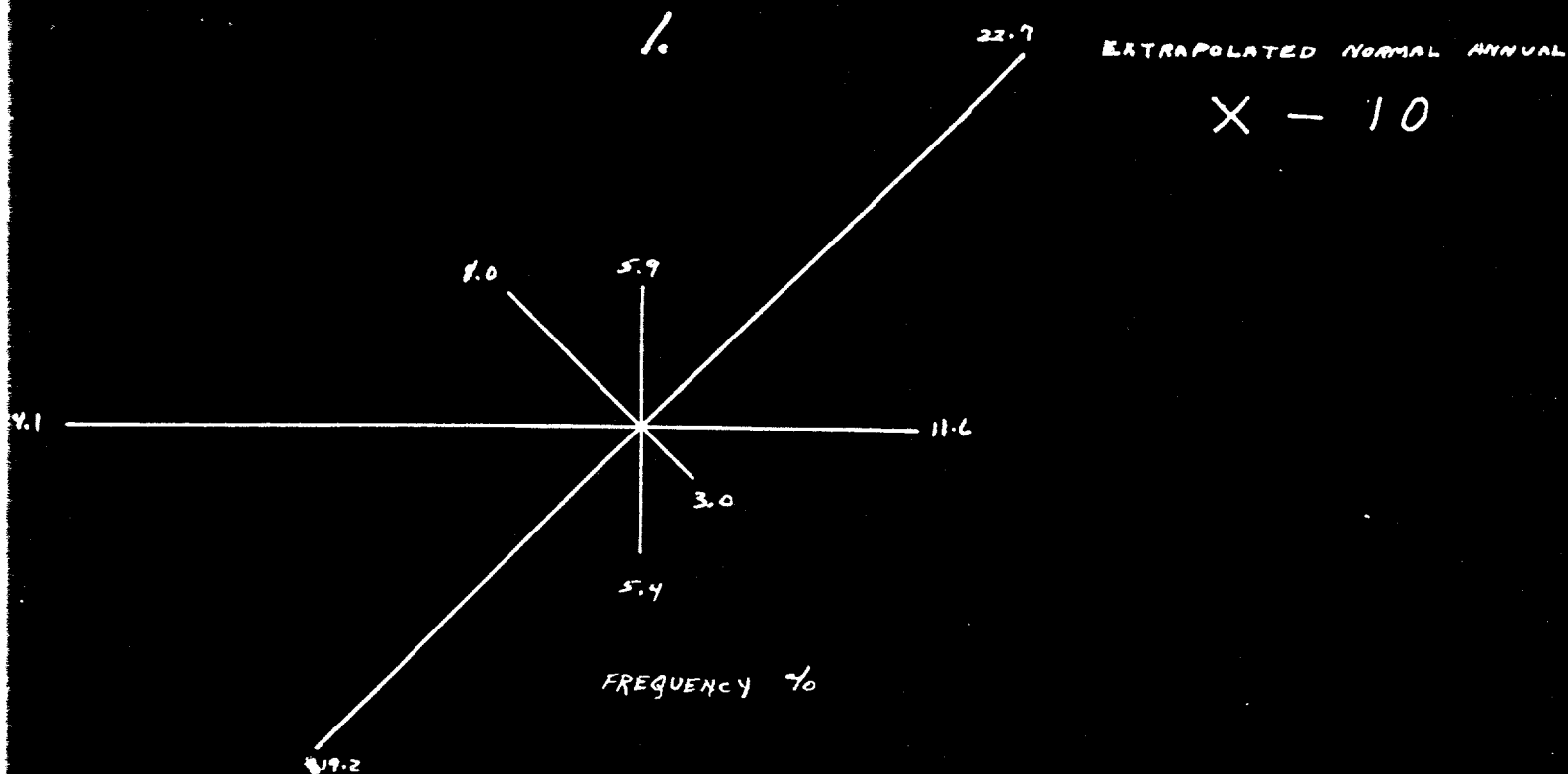
- a. Average difference in percentage frequency between the local station and Knoxville for the same period were computed for each direction. These direction frequency differences were assumed to be normal and were applied to the average Knoxville frequency rose for the longest period available to obtain an "extrapolated normal annual wind direction frequency rose" for each station.
- b. The ratio of average wind velocity for each direction at each local station to that at Knoxville Airport for the identical period was computed. These ratios were assumed to be normal. The average wind velocity from each direction at Knoxville Airport for the four-year period for which records were available were then multiplied by these ratios to obtain an "Extrapolated normal annual wind velocity rose" for each station.
- c. When the extrapolated normal annual frequency of any direction fell under 3.0% by the method in paragraph a. above, it was arbitrarily increased to 3.0% on the assumption that in terrain of this type, no direction would occur less than 3.0% of the time on a long-term average. The difference between the computed frequency and 3.0 was apportioned equally over the four major directions.

3. Applicability.

- a. X-10. These roses can be considered representative of conditions well above the valley floor but below the ridge tops in Bethel Valley, Bear Creek Valley or East Fork Valley between West Village and the west end of East Fork Ridge, which are fairly regular, narrow, U-shaped valleys. There is a prevailing WSW flow with secondary ENE drainage.
- b. Public Works Building. These roses can be considered representative of the more open valley locations such as the town of Oak Ridge, Western Emory Valley, the Wheat area, western East Fork Valley north of McKinney Ridge, etc., ENE drainage predominates over the WSW valley flow.
- c. K-25. These roses can be considered representative of the relatively flat terrain in the vicinity of K-25, Jones Island, and possibly between Gamble Valley and Emory Valley. Velocities are light and well distributed around the compass with a maximum

of ENE and minimum of NNW showing the shielding effect of the Cumberland Plateau.

- d. Y-12 Water Filtration Plant. This location is on a ridge-top and will probably be similar to other ridge-tops but not isolated peaks. Velocities are much greater than at the valley locations, particularly from NW and SW. Directions are well distributed around the compass. West winds would probably be even stronger if not for frictional reduction in travelling along the ridge.
- e. Knoxville Airport. This shows what the picture would probably be if the local ridges and valleys were removed. There is a NE - SW channelling by the Smokies and Cumberlands and rather even distribution of the remaining directions.



VELOCITY, M.P.H.

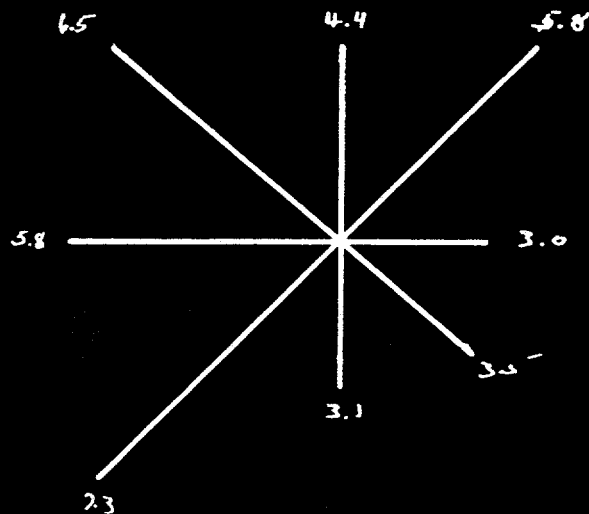
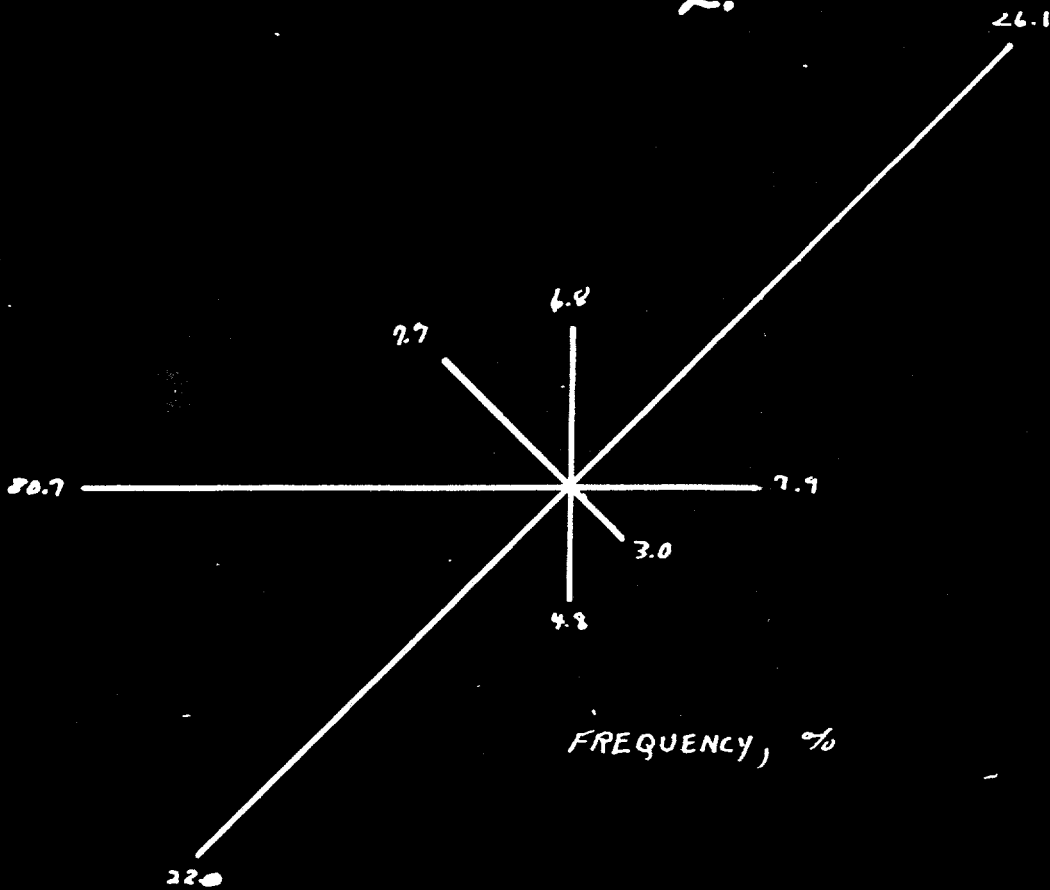
WEATHER BUREAU OFFICE
OAK RIDGE, TENN.

2.

X-10

ANNUAL Wind Rose

July 1944 - June 1945



WEATHER BUREAU OFFICE
OAK RIDGE, TENN.

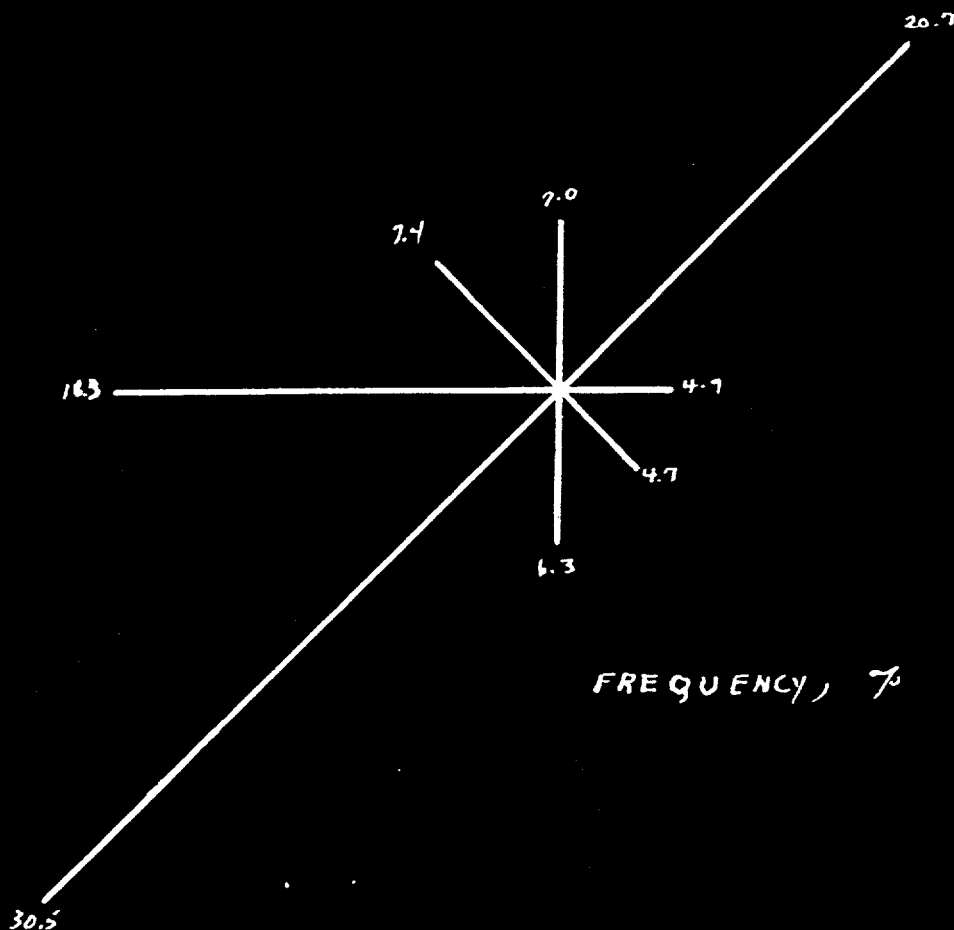
AVERAGE VELOCITY, M.P.H.

3.

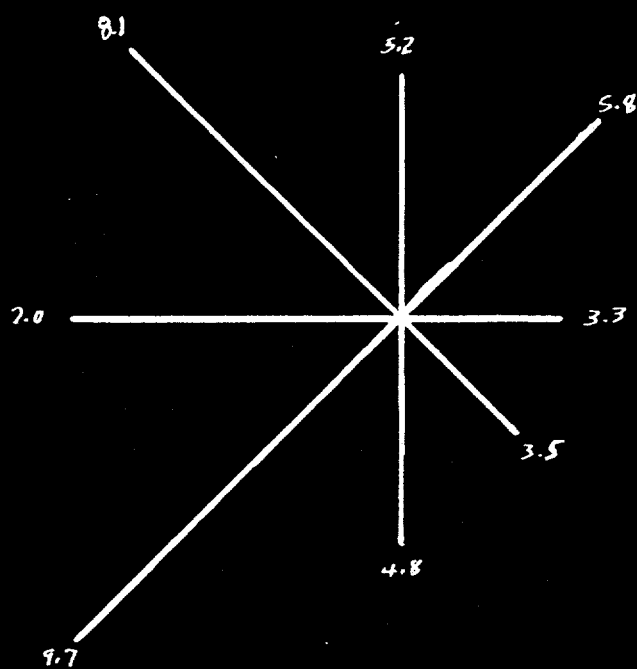
X-10

SPRING

(March - April -
May 1945)



FREQUENCY, %



AVERAGE VELOCITY, M.P.H.

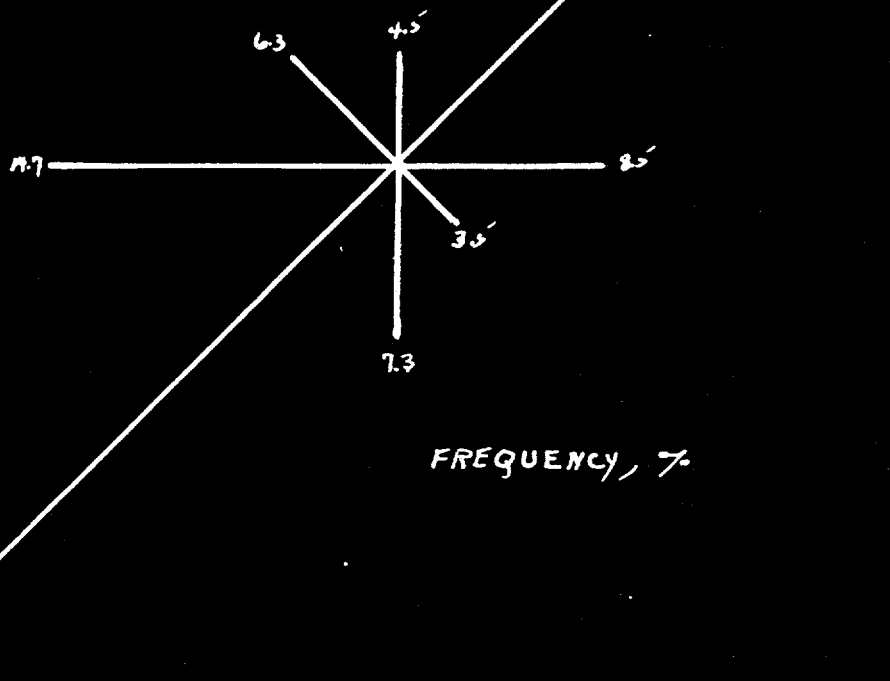
WEATHER BUREAU OFFICE
OAK RIDGE, TENN.

4.

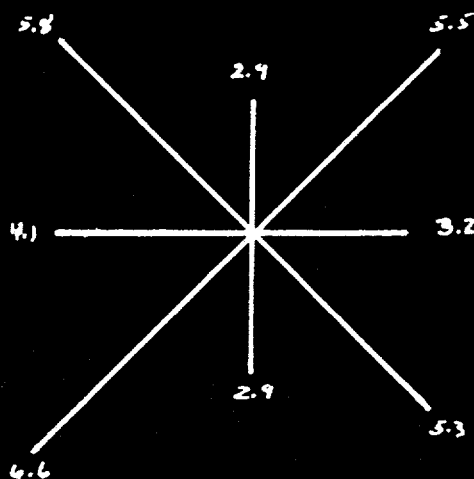
X-10

SUMMER

JUNE 45, JULY 44,
AUGUST 44

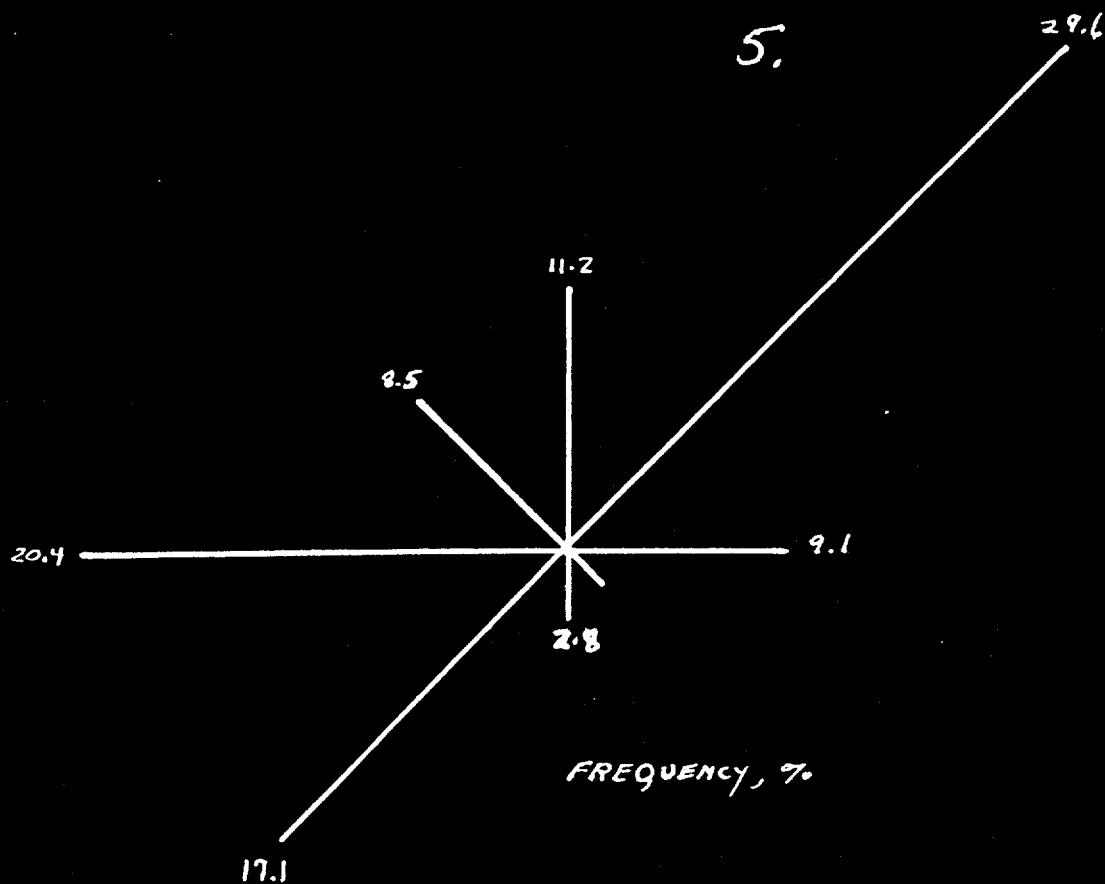


FREQUENCY, %



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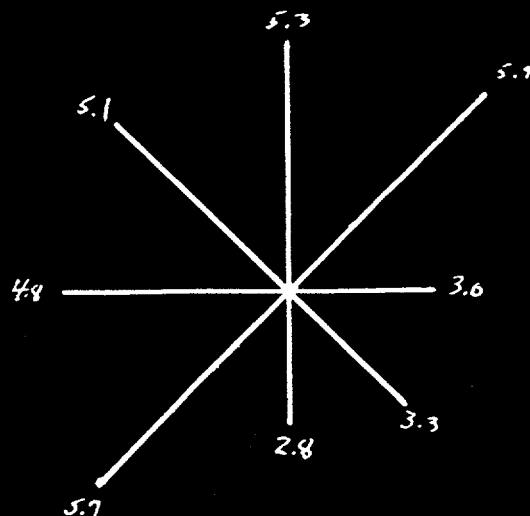
WEATHER BUREAU OFFICE
OAK RIDGE, TENN.



X-10

FALL

(Sept 44, Oct 44)
NOV - Ave 43-44



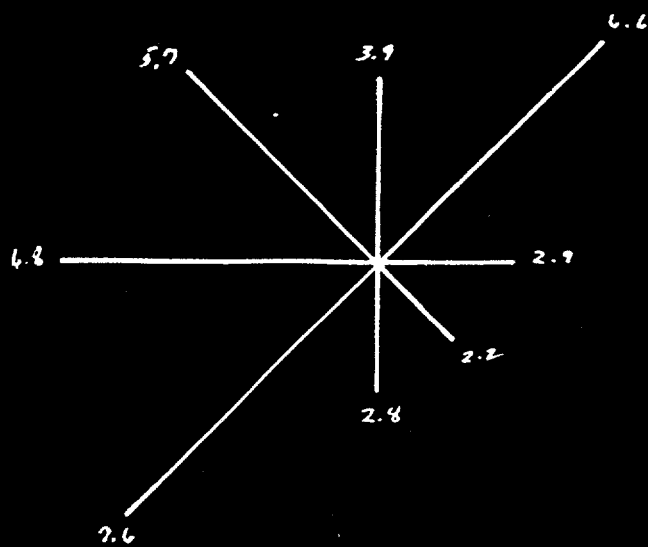
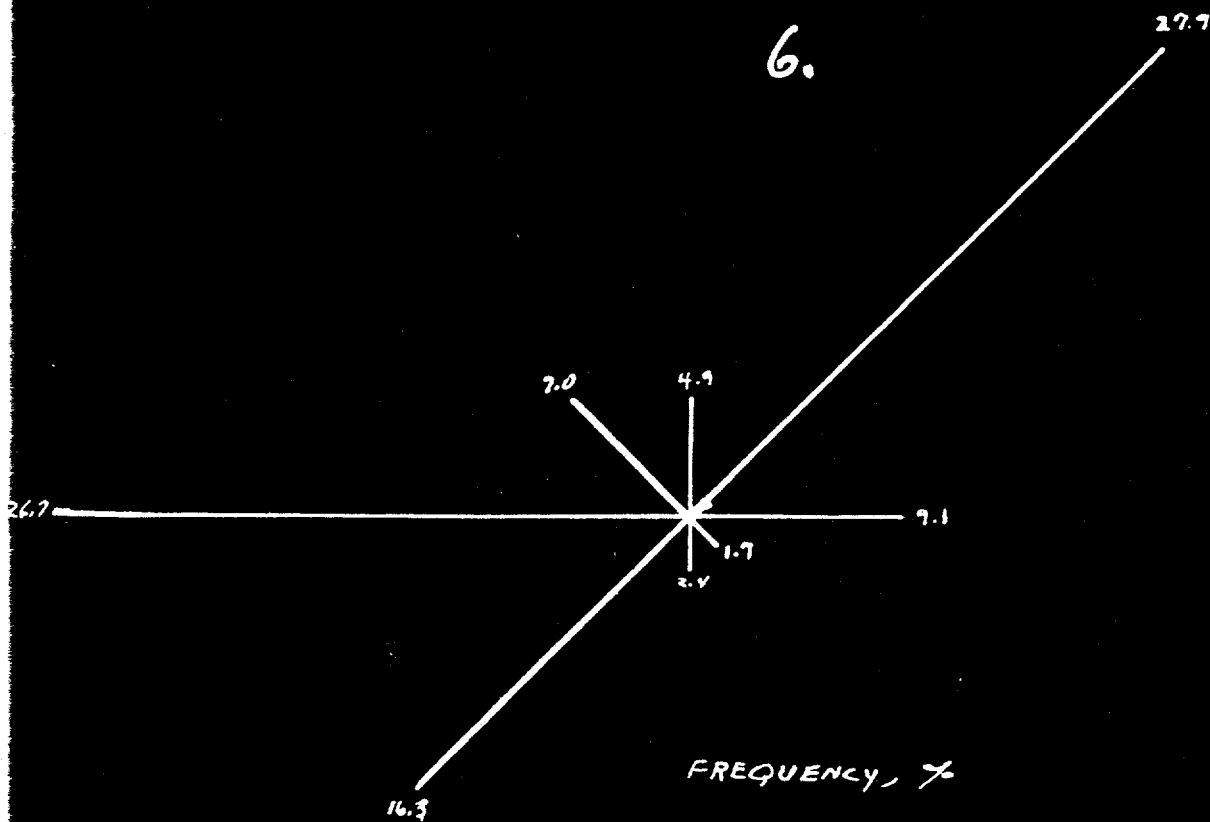
WEATHER BUREAU OFFICE
OAK RIDGE, TENN.

6.

X - 10

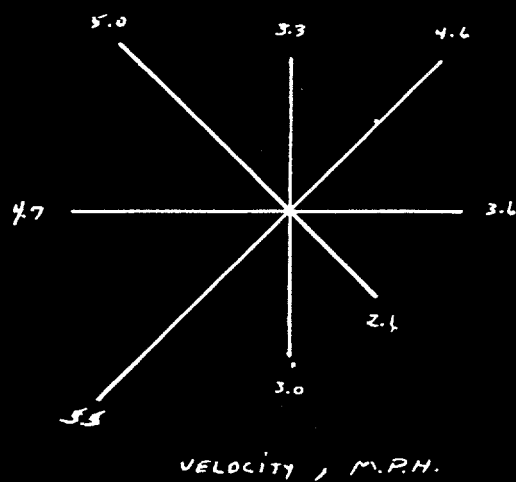
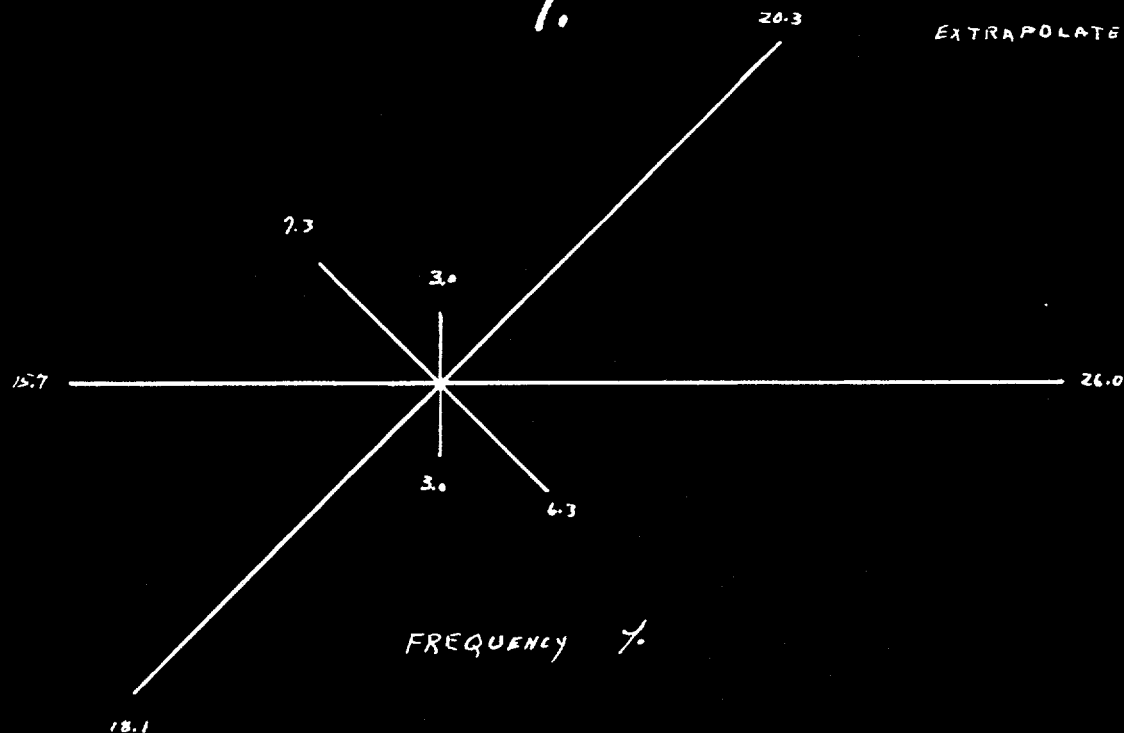
WINTER

(Dec - Ave 43-44)
(Jan - Ave 43-44)
(Feb - 45)



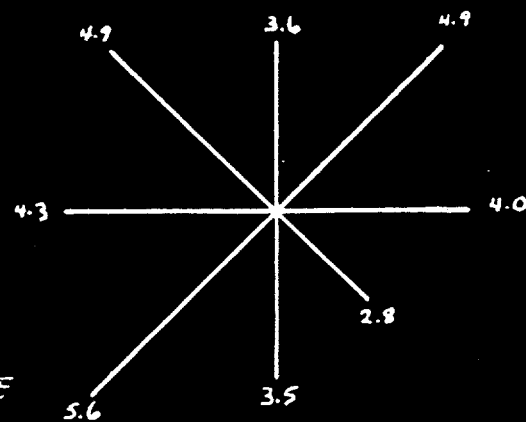
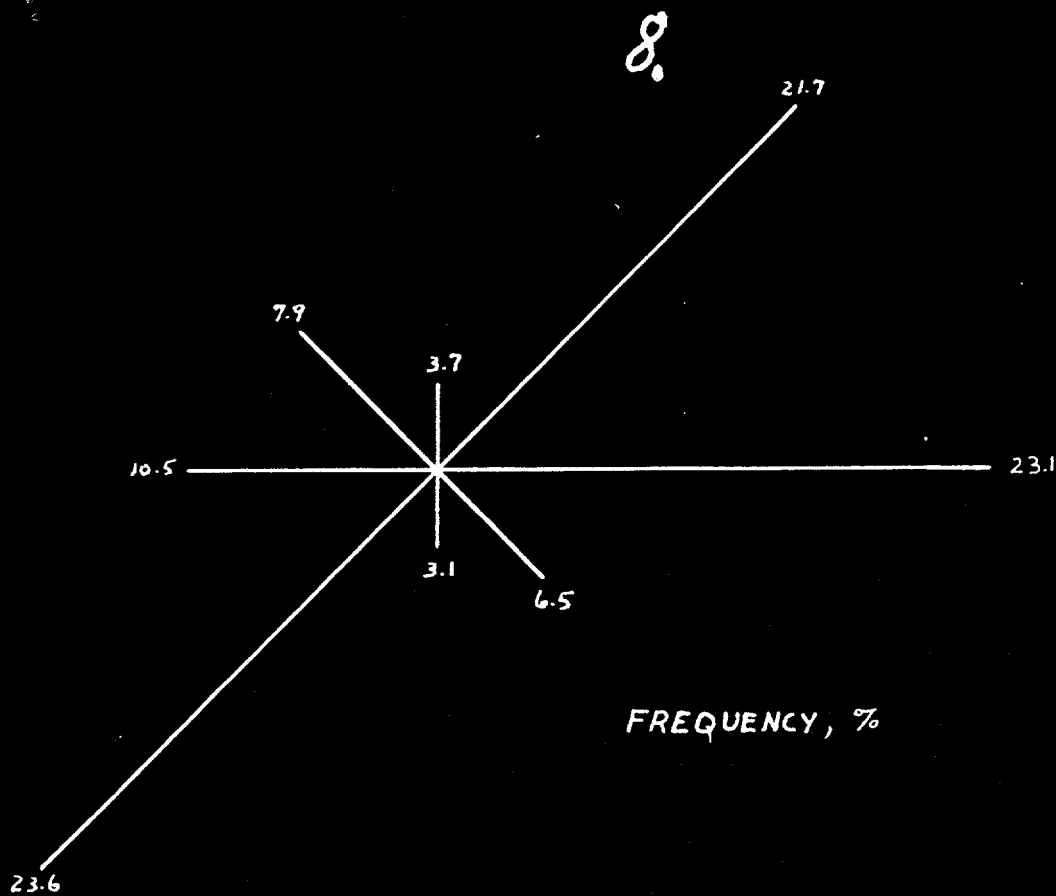
WEATHER BUREAU OFFICE
OAK RIDGE, TENNESSEE.

7.



WEATHER BUREAU OFFICE
DAK RIDGE, TENN.

PUBLIC WORKS BLDG.
ANNUAL WIND ROSE
DEC, 1947 - MAR, 1948
JUNE, 1948 - SEPT, 1948



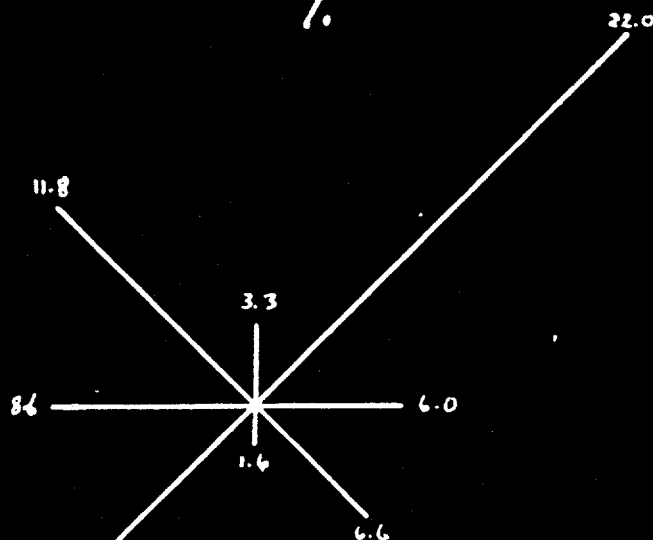
WEATHER BUREAU OFFICE
OAK RIDGE, TENN.

9.

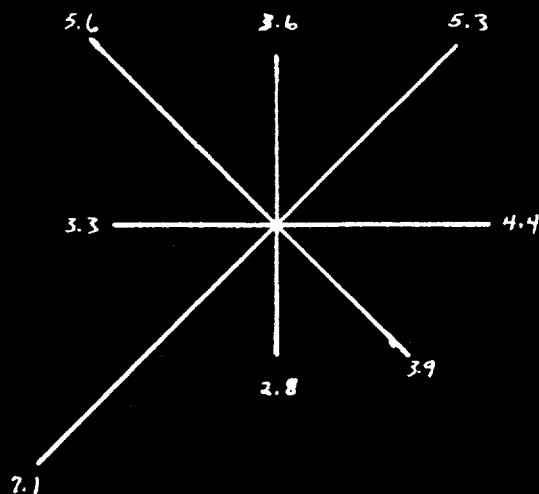
PUBLIC WORKS BLDG

SPRING

(MARCH + JUNE 1940)



FREQUENCY, %



WEATHER BUREAU OFFICE
OAK RIDGE, TENN.

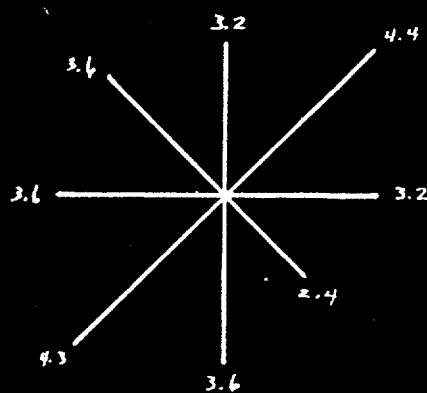
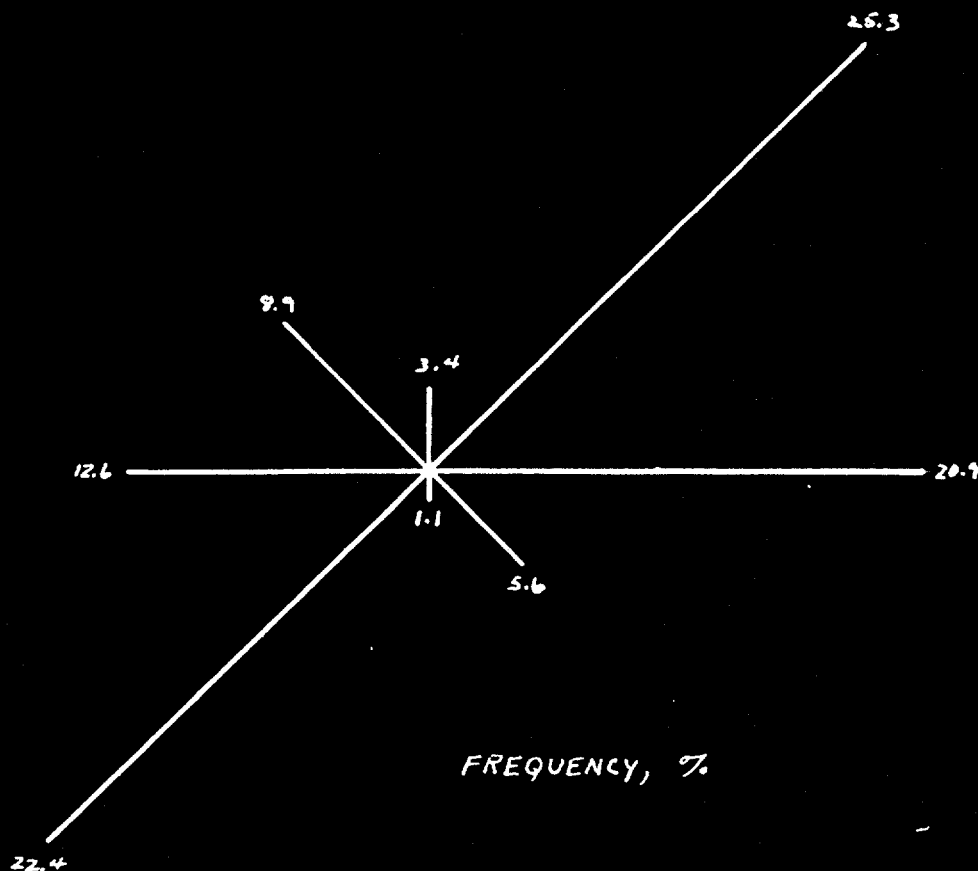
AVERAGE VELOCITY, M.P.H.

1a

PUBLIC WORKS BLDG.

SUMMER

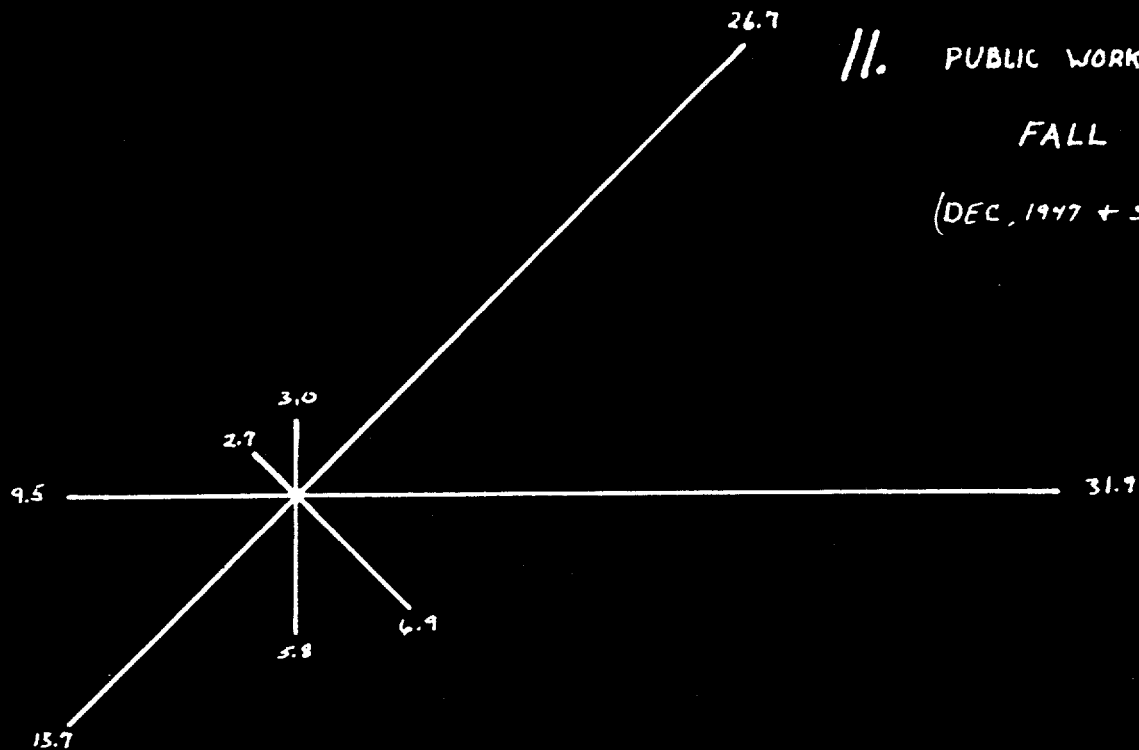
(JULY + AUGUST, 1948)



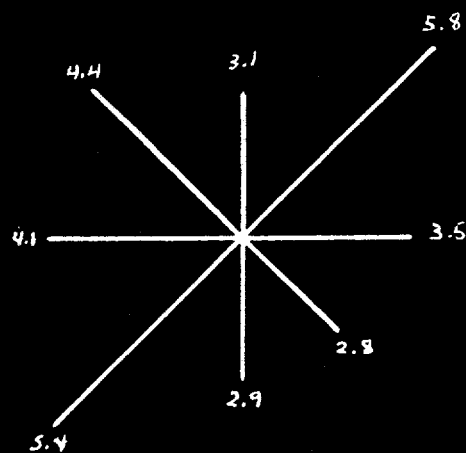
WEATHER BUREAU OFFICE
OAK RIDGE, TENN.

AVERAGE VELOCITY, M.P.H.

II. PUBLIC WORKS BLDG
FALL
(DEC, 1947 + Sept 1948)



FREQUENCY, %



WEATHER BUREAU OFFICE
OAK RIDGE, TENN.

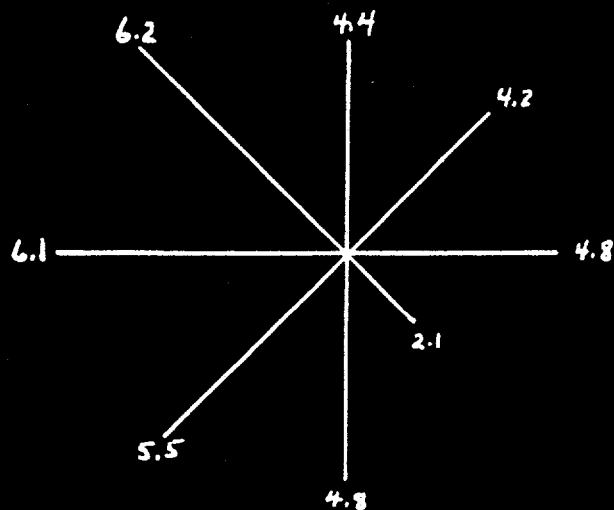
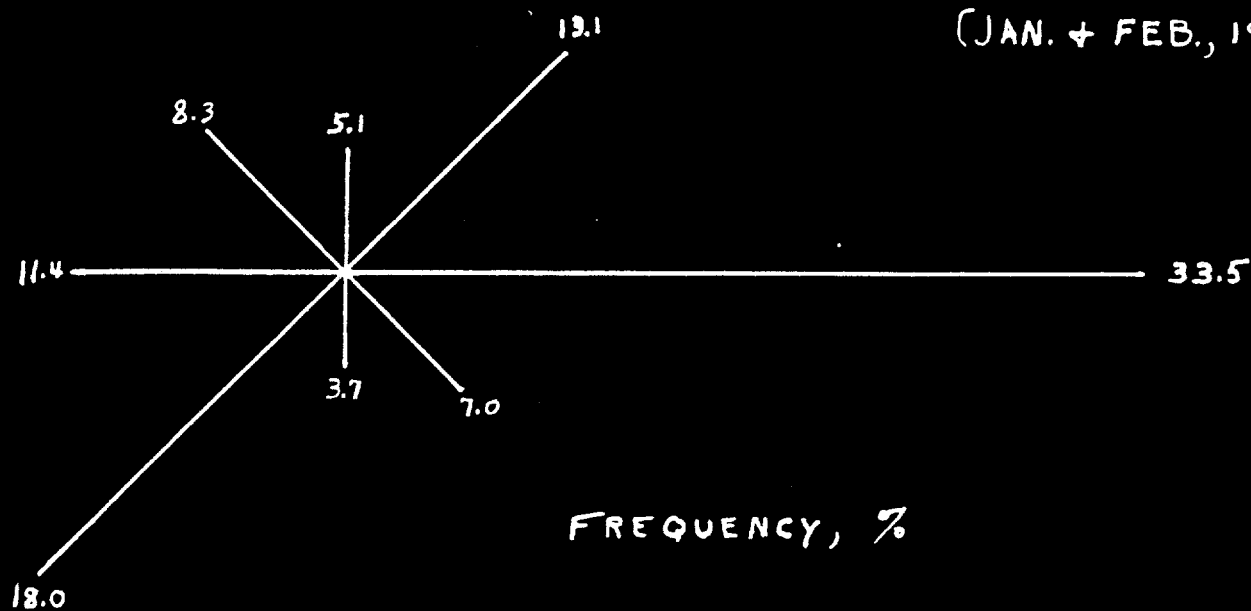
AVERAGE VELOCITY, M.P.H.

12.

PUBLIC Works BLDG.

WINTER

(JAN. + FEB., 1948)

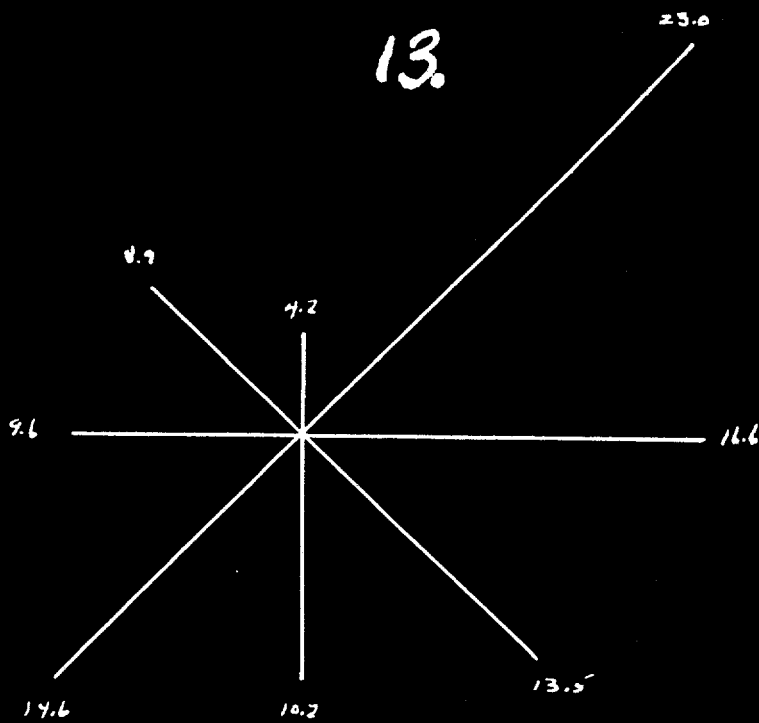


WEATHER BUREAU OFFICE
OAK RIDGE, TENN.

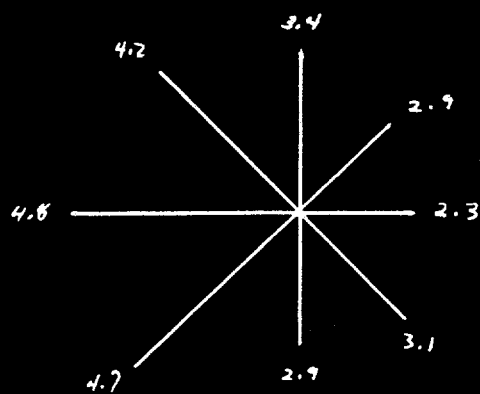
13.

K-25

EXTRAPOLATED NORMAL ANNUAL



FREQUENCY, %



VELOCITY, M.P.H.

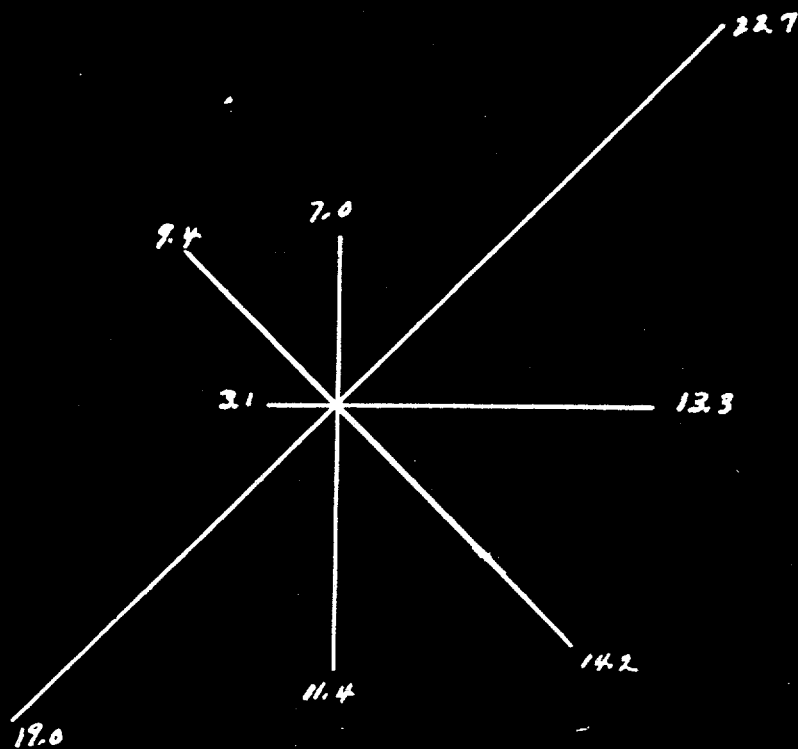
WEATHER BUREAU OFFICE
OAK RIDGE, TENN

14.

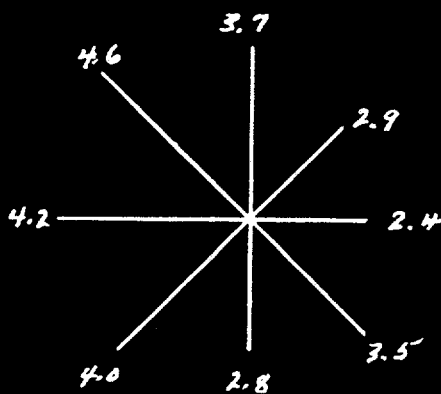
K-25

May June, Aug, Sep

1948



FREQUENCY %



AVERAGE VELOCITY, M.P.H.

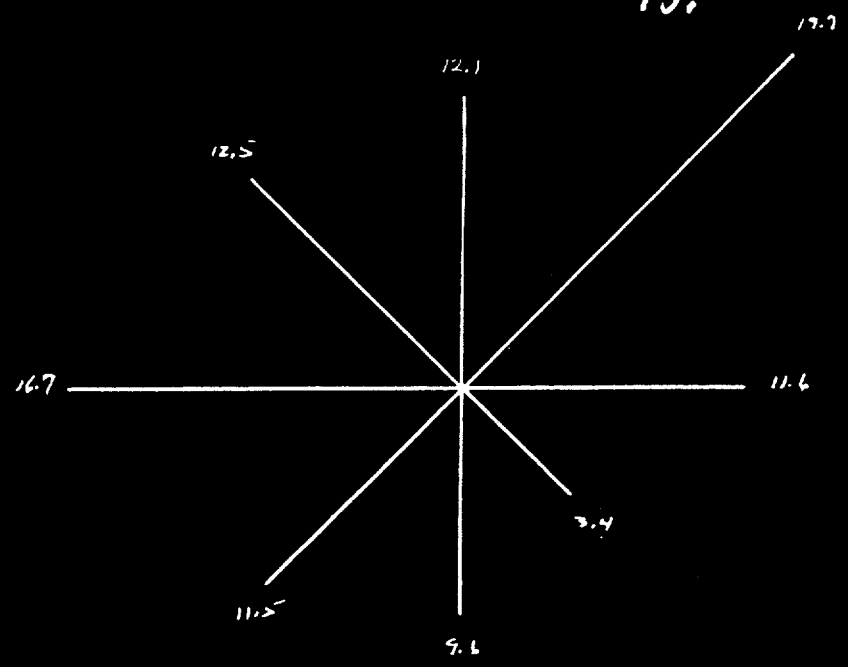
WEATHER BUREAU OFFICE
OAK RIDGE, TENN.

Y - 12

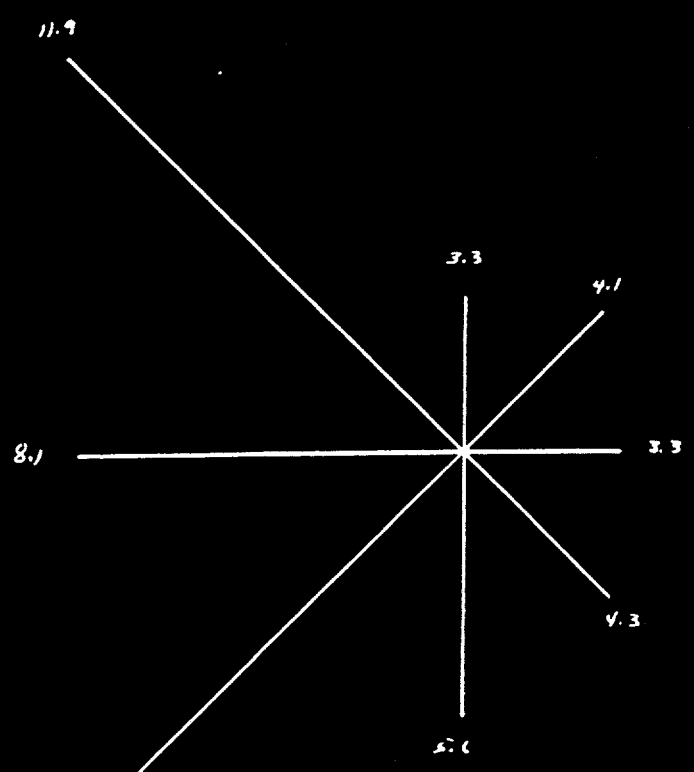
WATER FILTRATION PLANT

EXTRAPOLATED NORMAL ANNUAL

15.



FREQUENCY, %



VELOCITY, M.P.H.

WEATHER BUREAU OFFICE
OAK RIDGE, TENN.

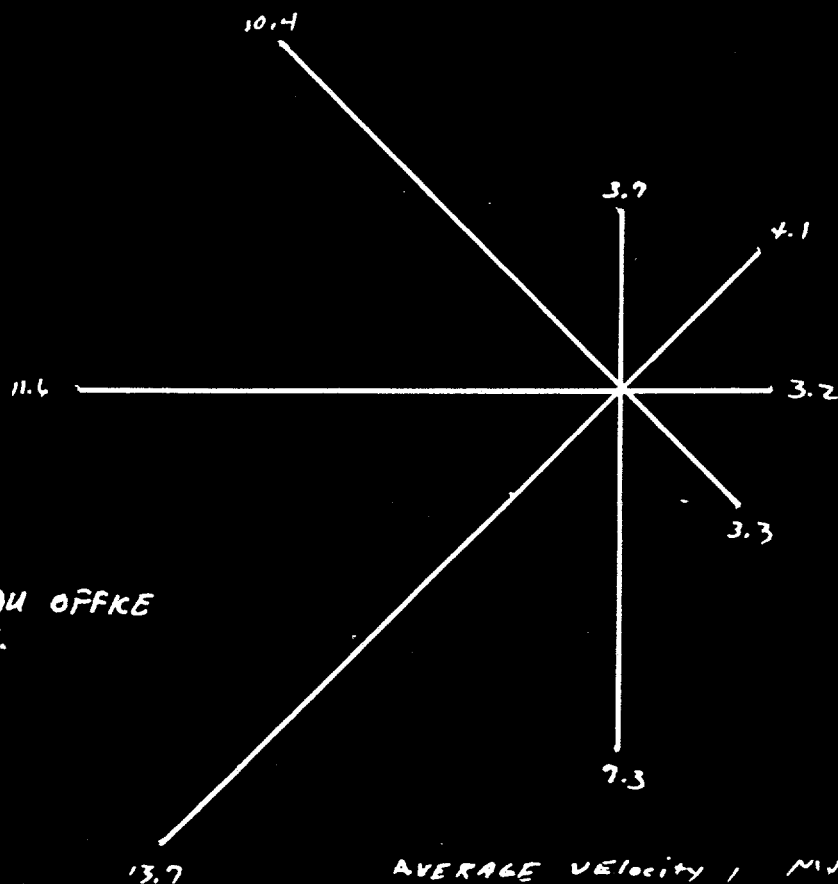
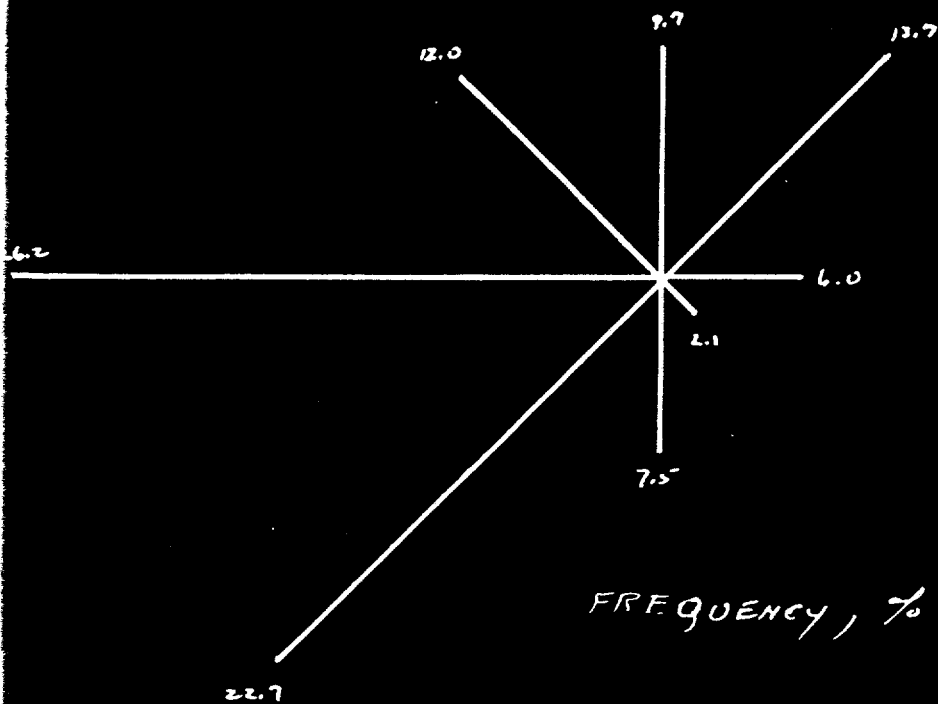
16.

γ - 12

WATER FILTRATION PLANT

WINTER

JAN 19, FEB 13, 1947



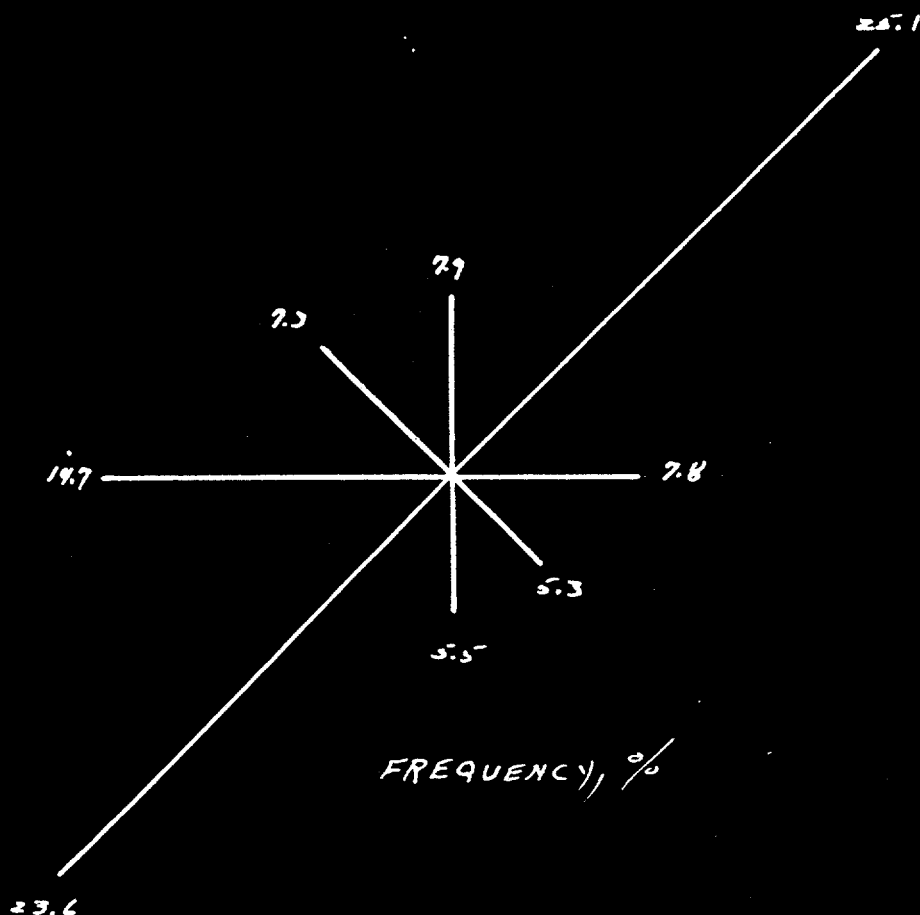
WEATHER BUREAU OFFICE
OAK RIDGE, TENN.

17.

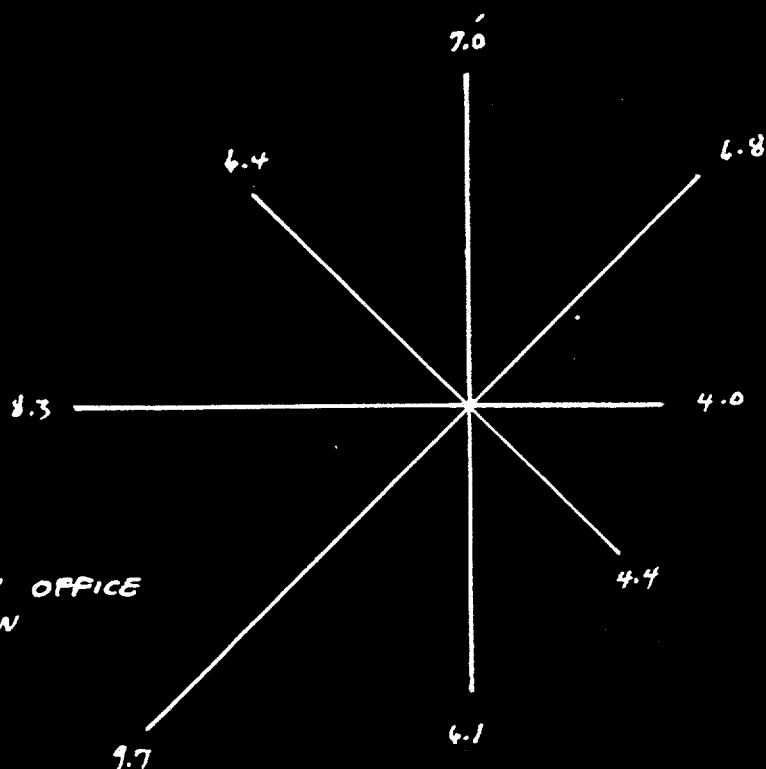
KNOXVILLE AIRPORT

ANNUAL

1939 - 1948



FREQUENCY, %



1944 - 1947

WEATHER BUREAU OFFICE
OAK RIDGE, TENN

AVERAGE VELOCITY, M.P.H.